PROPOSAL FOR
NO FURTHER ACTION
Environmental Restoration Project

Site 140, Building 9965 Septic System
Operable Unit 1295
January 1997

Prepared by
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Albuquerque, New Mexico

Prepared for the
Department of Energy

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1.0 INTRODUCTION

1.1 ER Site 140, Building 9965 Septic System

Sandia National Laboratories/New Mexico (SNL/NM) is proposing a no further action (NFA) decision based on confirmatory sampling for Environmental Restoration (ER) Site 140, Building 9965 Septic System, Operable Unit (OU) 1295. ER Site 140 is listed in the Hazardous and Solid Waste Amendments (HSWA) Module IV (EPA August 1993) of the SNL/NM Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Facility Permit (NM5890110518-1) (EPA August 1992).

1.2 SNL/NM Administrative NFA Process

This proposal for a determination of an NFA decision based on confirmatory sampling was prepared using the process presented in Section 4.5.3 of the SNL/NM Program Implementation Plan (PIP) (SNL/NM February 1995) . It follows guidance documented in 40 CFR 264.514[a] [2]) that states NFAs "must contain information demonstrating that there are no releases of hazardous waste (including hazardous constituents) from solid waste management units (SWMUs) at the facility that may pose a threat to human health or the environment" (EPA July 1990). The HSWA Module IV contains the same requirements for an NFA demonstration:

> "Based on the results of the RFI [RCRA Facility Investigation] and other relevant information, the Permittee may submit an application to the Administrative Authority for a Class III permit modification under 40 CFR 270.42(c) to terminate the RFI/CMS [corrective measures study] process for a specific unit. This permit modification application must contain information demonstrating that there are no releases of hazardous waste including hazardous constituents from a particular SWMU at the facility that pose threats to human health and/or the environment, as well as additional information required in 40 CFR 270.42(c) (EPA August 1993)."

If the available archival evidence is not considered convincing, SNL/NM performs confirmatory sampling to increase the weight of the evidence and allow an informed decision on whether to proceed with the administrative-type NFA or to return to the site characterization program for additional data collection (SNL/NM February 1995).

The Environmental Protection Agency (EPA) acknowledged that the extent of sampling required may vary greatly, stating that:

> the agency does not intend this rule [the second codification of HSWA] to require extensive sampling and monitoring at every SWMU. . . . Sampling is generally required only in situations where there is insufficient evidence on which to make an initial release determination. . . . The actual extent of sampling will vary . . . depending on the amount and quality of existing information available (EPA December 1987).

This request for an NFA decision for ER Site 140 is based primarily on results of confirmatory soil samples collected at the site. Concentrations of site-specific constituents of concern (COCs) detected in the soil samples were first compared to background 95th percentile or upper tolerance limit (UTL) concentrations of COCs found in SNL/NM soils (IT March 1996), or other relevant background limits. If no SNL/NM background limit was available for a particular COC, or if the COC concentration exceeded the SNL/NM or other relevant background limit, then the constituent concentration was compared to the proposed 40 CFR Part 264 Subpart S (Subpart S) or other relevant soil action level for the compound (EPA July 1990).

A site is eligible for an NFA proposal if it meets one or more of the following criteria presented in the Environmental Restoration Document of Understanding (NMED November 1995):

- NFA Criterion 1: The site cannot be located or has been found not to exist, is a duplicate potential release site (PRS) or is located within and therefore, investigated as part of another PRS.

- NFA Criterion 2: The site has never been used for the management (that is, generation, treatment, storage, or disposal) of RCRA solid or hazardous wastes and/or constituents or other CERCLA hazardous substances.

- NFA Criterion 3: No release to the environment has occurred, nor is likely to occur in the future.

- NFA Criterion 4: There was a release, but the site was characterized and/or remediated under another authority which adequately addresses corrective action, and documentation, such as a closure letter, is available.

- NFA Criterion 5: The PRS has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use.

Review and analysis of the ER Site 140 soil sample analytical data indicates that the concentration of each of the COCs detected in soils at this site is either less than (1) the relevant SNL/NM or other applicable background concentration, or (2) proposed Subpart S or other action level. Thus, ER Site 140 is being proposed for an NFA decision based on confirmatory sampling data demonstrating that hazardous waste or COCs that may have been released from this SWMU into the environment pose an acceptable level of risk under current and projected future land use (Criterion 5).

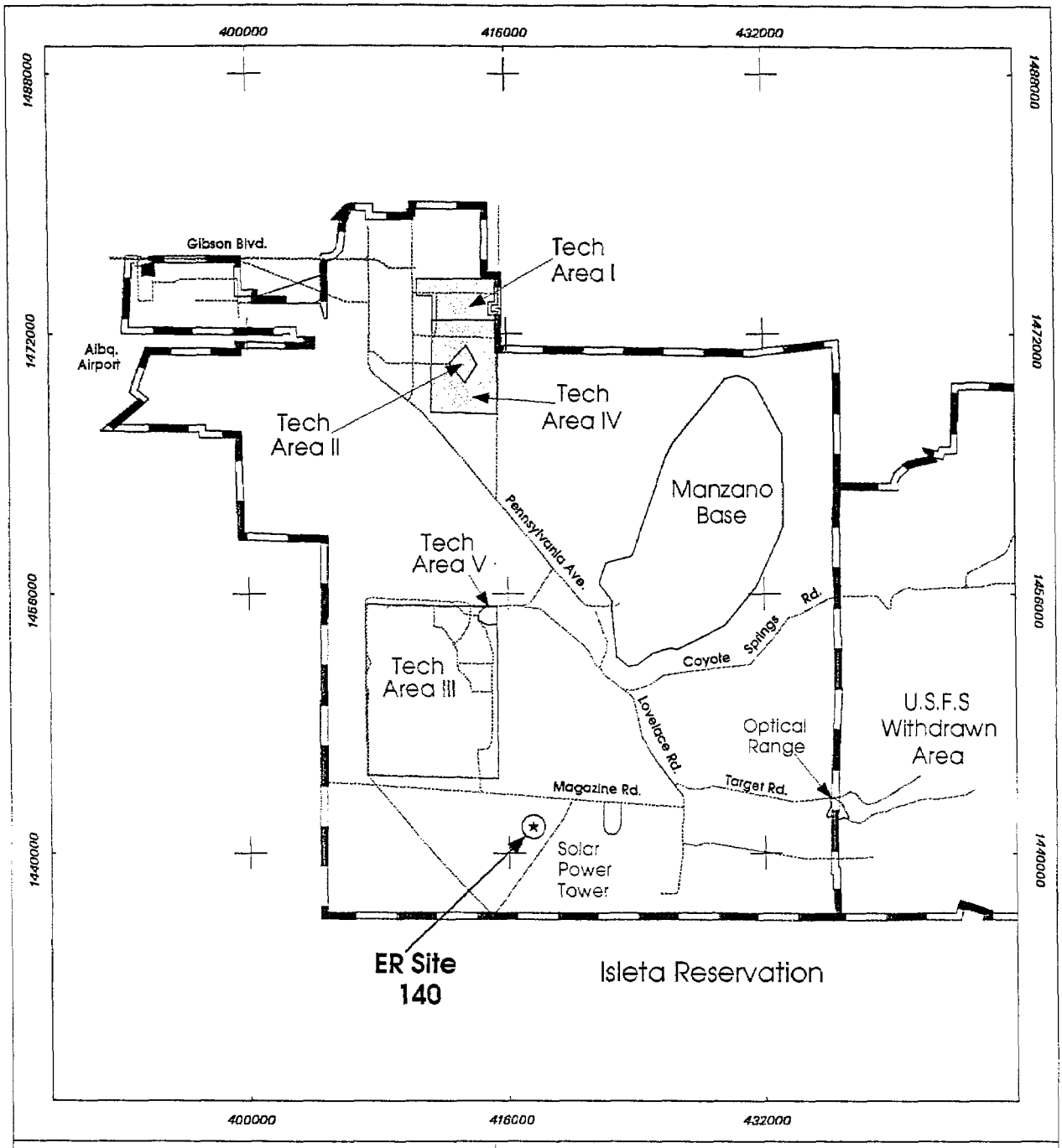
1.3 Local Setting

SNL/NM occupies 2,829 acres of land owned by the Department of Energy (DOE), with an additional 14,920 acres of land provided by land-use permits with Kirtland Air Force Base (KAFB), the United States Forest Service (USFS), the State of New Mexico, and the Isleta Indian Reservation. SNL/NM has been involved in nuclear weapons research, component development, assembly, testing, and other research and development activities since 1945 (DOE September 1987).

ER Site 140 is located in Thunder Range on KAFB and is approximately 0.8 miles southeast of Technical Area III (TA III). Access to the site is provided by paved and graded dirt roads that extend southwest from Lovelace Road, and south from Magazine Road (Figure 1-1). ER Site 140 consists of the immediate area around the seepage pit and septic tank southwest of Building 9965, and the immediate area around the drywell that is north of Building 9965 (Figure 1-2). The area around the seepage pit and septic tank is approximately 0.05 acres and the area around the drywell is approximately 0.03 acres. Both areas are at a mean elevation of 5,487 feet above mean sea level (amsl).

The surficial geology at ER Site 140 is characterized by alluvial fan deposits (SNL/NM March 1996). Based on drilling records of similar deposits at KAFB, the alluvial fan materials are highly heterogeneous, composed primarily of medium to fine silty sands with frequent coarse sand, gravel, and cobble lenses. The alluvial fan deposits probably extend to the water-table. Vegetation consists predominantly of grasses including gramma, muhly, dropseed, and galleta. Shrubs commonly associated with the grasslands include sand sage, winter fat, saltbrush, and rabbitbush. Cacti are common, and include cholla, pincushion, strawberry, and prickly pear (SNL/NM March 1993).

The water-table elevation is approximately 5,280 feet amsl at this location, so depth to ground water is approximately 207 feet below the ground surface (fbgs). Local groundwater flow is believed to be in a generally west to northwest direction in the vicinity of this site (SNL/NM March 1996). The nearest production wells are northwest of the site and include KAFB-2, KAFB-4, and KAFB-7 which are approximately 5.4 to 6.2 miles away. The ground-water monitoring wells closest to ER Site 140 include the group of wells installed around the Chemical Waste Landfill in the southeast corner of TA III. These wells are located approximately 0.9 miles northwest of ER Site 140 (SNL/NM October 1995).



Legend

- ER Site 140
- Major Roads
- KAFB Boundary
- Technical Areas

Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1927 North American Horizontal Datum, 1929 North American Vertical Datum

DRAFT
Unclassified

0 5000 10000
Scale in Feet

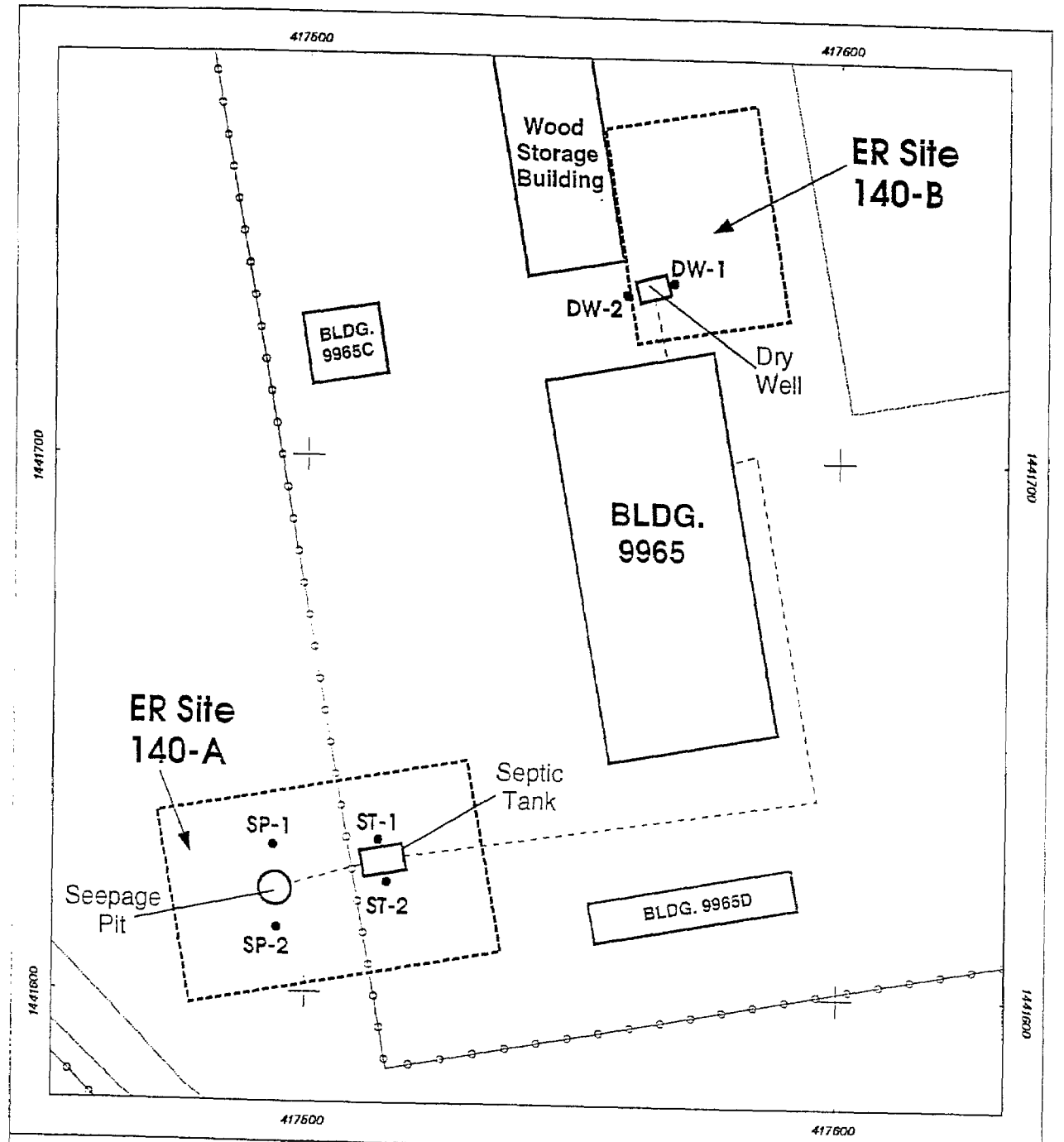
0 1200 2400
Scale in Meters

N

GIS

Figure 1-1
Location Map for ER Site 140
Sandia National Laboratories,
New Mexico

scmorri SNL GIS ORG. 7612 06/12/98 MAPID=960931



Legend

- Boring Location
- Fences
- KAFB Roads
- Buildings
- Sanitary Sewerline
- Septic Tank, Seepage Pit, Dry Well
- ER Site 140

Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1927 North American Horizontal Datum, 1929 North American Vertical Datum

DRAFT
Unclassified

0 15 30
Scale in Feet

0 3.6 7.2
Scale in Meters

N

FIGURE 1-2
Site Map for ER Site 140
Sandia National Laboratories,
New Mexico

scmorri SNL GIS ORG. 7612 07/08/98 MAPID=961007

2.0 HISTORY OF THE SWMU

2.1 Sources of Supporting Information

In preparing the confirmatory sampling NFA proposal for ER Site 140, available background information was reviewed to quantify potential releases and to select analytes for the soil sampling. Background information was collected from SNL/NM Facilities Engineering drawings and interviews with employees familiar with site operational history. The following sources of information were used to evaluate ER Site 140:

- Confirmatory subsurface soil sampling and backhoe excavation conducted in September 1994 (SNL/NM September 1994a), November 1994 (SNL/NM November 1994a) and January 1995 (SNL/NM January 1995a and b);
- Two survey reports, including a geophysical survey (Lamb 1994), and a passive soil gas survey (NERI June 1995);
- Results of samples collected from the septic tank in 1992 (SNL/NM June 1993) and 1994 (SNL/NM April 1994 and November 1994b);
- Approved RCRA Facility Investigation (RFI) Work Plan and addenda for OU 1295, Septic Tanks and Drainfields (SNL/NM March 1993, November 1994c, December 1994, January 1995c, March 1995a, March 1995b, and May 1995; and EPA September 1994, January 1995, and March 1995);
- Photographs and field notes collected at the site by SNL/NM ER staff;
- SNL/NM Facilities Engineering building drawings (SNL/NM June 1967 and August 1987);
- SNL/NM Geographic Information System (GIS) data; and
- The RCRA Facility Assessment (RFA) report (EPA April 1987).

2.2 Previous Audits, Inspections, and Findings

ER Site 140 was first listed as a potential release site in the RFA report to the EPA in 1987 (EPA April 1987). This report contained a generic statement about this and many other SNL/NM septic systems that sanitary and industrial wastes may have been discharged to septic tanks and drainfields during past operations. This SWMU was included in the RFA report as Site 79, along with other septic and drain systems at SNL/NM. All the sites included in Site 79 are now designated by individual SWMU numbers.

2.3 Historical Operations

The following historical information has been excerpted from several sources, including SNL/NM March 1993, IT March 1994, and SNL/NM November 1994c.

Building 9965 was constructed in 1965 and used as a control building for the Shock Facility. The building was also used as a darkroom for photographic processing of black and white film. The building has one restroom, two hand sinks, and two floor drains. One hand sink was used for disposal of photographic processing wastewater. The second sink is located in the main equipment area and was used principally for hand washing. The two floor drains are connected to a drywell north of the building. The RFI indicated that there were two drywells associated with Building 9965, one that was abandoned in place and a second drywell installed in July 1972 to replace the first. Excavation, both north and west of the active drywell at the site, did not find evidence of a drywell abandoned in place (SNL/NM January 1995d). Therefore, only one drywell was included in the investigation of ER Site 140.

Potential contaminants from Building 9965 included elemental carbon, aluminum oxide, photoprocessing waste, and possibly nitric acid. It was assumed for completeness that any of these wastes could have been disposed to either the septic system or the drywell at ER Site 140.

The drywell and septic system are no longer active. Building 9965, as of 1993, is connected to an extension of the City of Albuquerque sanitary sewer system.

3.0 EVALUATION OF RELEVANT EVIDENCE

3.1 Unit Characteristics

There are no safeguards inherent in the drain systems from Buildings 9965, or in facility operations that could have prevented past releases to the environment.

3.2 Operating Practices

As discussed in Section 2.3, effluent was released to the Building 9965 septic tank and seepage pit when the septic system was active. Also, effluent may have been released to the drywell. Hazardous wastes were not managed or contained at ER Site 140.

3.3 Presence or Absence of Visual Evidence

No visible evidence of soil discoloration, staining, or odors indicating residual contamination was observed when soil samples were collected around the seepage pit and septic tank in September 1994 (SNL/NM September 1994a) and November 1994 (SNL/NM November 1994a), near the drywell in January 1995 (SNL/NM January 1995a and January 1995d), or in the backhoe excavations near the seepage pit in January 1995 (SNL/NM January 1995e).

3.4 Results of Previous Sampling/Surveys

Sludge and aqueous samples were collected from the ER Site 140 septic tank in July 1992. The aqueous sample was analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), metals, selected radionuclide constituents and several miscellaneous analytes. The VOC trichloroethene (TCE) was identified. The pesticides beta-BHC, 4,4'-DDD, and 4,4'-DDE were detected. Several metals and radionuclides were detected as well as phenolic compounds, nitrates/nitrites, formaldehyde, fluoride, cyanide, and oil and grease. No PCBs were detected.

The sludge sample was analyzed for heavy metals and selected radionuclide constituents. Several metals and radionuclides were detected. The analytical results of the 1992 aqueous and sludge samples are presented in Appendix A.1.

A second round of septic tank sludge samples were collected for waste characterization purposes in April 1994 and were analyzed for VOCs and RCRA Toxicity Characteristic Leaching Procedure (TCLP) metals. Concentrations of eight VOC compounds (acetone, benzene, 2-butanone, carbon disulfide, ethyl benzene, methylene chloride, toluene, and total xylenes) were identified in the material. Two RCRA TCLP metals, barium and mercury, were detected in the sludge. The analytical results of the second round of septic tank samples are presented in Appendix A.2.

A third round of waste characterization sludge and liquid samples were collected in November 1994 and were analyzed for SVOCs, isotopic uranium, gamma spectroscopy radionuclides, and tritium (SNL/NM November 1994b). No SVOCs were detected. Several radionuclides were

detected. The analytical results of the third round of septic tank sludge characterization samples are also presented in Appendix A.2.

A geophysical survey was conducted in June 1994 using a Schonstedt 52B magnetic locator (Lamb 1994). The purpose of this survey was to locate the two drywells thought to exist north of Building 9965. The active drywell generated a distinct magnetic signature and was easy to locate with high confidence. Another feature west of the active drywell generated a weak magnetic signature, and was thought to possibly be the second drywell. However, because the second feature had such a poor magnetic signature, it was thought that what was identified as a second drywell might actually be a magnetic anomaly due to other buried metal.

A passive soil-gas survey conducted in June and July 1994 used PETREX™ sampling tubes to identify any releases of VOCs and SVOCs that may have occurred from the seepage pit, septic tank, and drywell (SNL/NM June 1994). A PETREX™ tube soil-gas survey is a semi-quantitative screening procedure that can be used to identify many VOCs and SVOCs. This technique may be used to guide VOC and SVOC site investigations. The advantages of this sampling methodology are that large areas can be surveyed at relatively low cost, the technique is highly sensitive to organic vapors, and the result produces a measure of soil vapor chemistry over a two- to three-week period rather than at one point in time. Each PETREX™ soil-gas sampler consists of two activated-charcoal-coated wires housed in a reusable glass test tube container. At each sampling location, sample tubes are buried in an inverted position so that the mouth of the sampler is about 1 foot below grade. Samplers are left in place for a two- to three-week period, and are then removed from the ground and sent to the manufacturer, Northeast Research Institute (NERI), for analysis using thermal desorption-gas chromatography/mass spectrometry. The analytical laboratory reports all sample results in terms of "ion counts" instead of concentrations, and identifies those samples that contain compounds above the PETREX™ technique detection limits. In NERI's experience, levels below 100,000 ion counts for a single compound (such as perchloroethene [PCE] or trichloroethene [TCE]), and 200,000 ion counts for mixtures (such as BTEX or aliphatic compounds [C4-C11 cycloalkanes]), under normal site conditions, would not represent detectable levels by standard quantitative methods for soils and/or groundwater (NERI June 1995).

Six PETREX™ tube samplers were placed in a grid pattern that surrounded the seepage pit and septic tank, and another six were placed in a grid pattern surrounding the drywell (SNL/NM June 1994). The locations of all PETREX™ samples are shown in Appendix A.3. The locations of those surrounding the drywell are approximate; a final survey of their locations was not completed. The results from all the samplers at ER Site 140 caused NERI to classify ER Site 140 as having 'no significant soil gas detections.' The analytical results from the ER Site 140 passive soil gas survey are presented in Appendix A.3.

3.5 Assessment of Gaps in Information

The most recent material in the tank was not necessarily representative of all discharges to the unit that have occurred since it was put into service in 1965. The analytical results of the various rounds of septic tank sampling were used, along with process knowledge and other available information, to help identify the most likely COCs that might be found in soils surrounding the septic tank, seepage pit and drywell, and to help select the types of analyses to be performed on soil samples collected from the site. While the history of past releases at the site is incomplete, analytical data from confirmatory soil samples collected in September, November and January (discussed below) are sufficient to determine whether releases of COCs occurred at the site.

3.6 Confirmatory Sampling

Although the likelihood of hazardous waste releases at ER Site 140 was considered low, confirmatory soil sampling was conducted to determine whether COCs above background or detectable levels were released at this site. Soil samples were collected from the area immediately around the seepage pit, septic tank, and drywell in September 1994 (SNL/NM September 1994a), November 1994 (SNL/NM November 1994a) and January 1995 (SNL/NM January 1995a). With the exceptions noted in the next paragraph, the confirmatory soil sampling program was performed in accordance with the rationale and procedures described in the approved Septic Tank and Drainfields (ADS-1295) RFI Work Plan (SNL/NM March 1993, November 1994c, December 1994, January 1995c, March 1995a, March 1995b, and May 1995; and EPA September 1994, January 1995, and March 1995). A summary of the types of samples, number of sample locations, sample depths and analytical requirements for confirmatory soil samples collected at this site is presented in Table 3-1.

Soil samples were collected from borings located on opposite sides of the seepage pit, septic tank, and drywell in September and November 1994, and January 1995 respectively (Figure 1-2). Sampling around the seepage pit was started at 11 fbgs; the Geoprobe ™ met resistance at about 14 fbgs at all locations around the seepage pit. This difficulty meant that the shallow samples had to be collected from six separate closely-spaced locations. Four of the locations were north of the seepage pit within two ft of the SP-1 location shown on Figure 1-2, and two were south of the seepage pit within two ft of the location of SP-2 shown on Figure 1-2. The four tries are thus identified as SP-1 and the two tries SP-2. Also, because of the refusal at 14 fbgs, it was not possible to obtain a deep sample. Backhoe excavation in January 1995 uncovered two caliche layers at this site (SNL/NM January 1995e). One layer was 0.5 to 1.0 ft thick at 8 to 9 fbgs. The other layer started at about 13 fbgs and could not be penetrated with a backhoe.

In each of the two septic tank borings, the depth interval for the sample started at a depth level with the bottom of the septic tank which was measured to be 7 fbgs (SNL/NM November 1994a). The soil sampling operation next to the septic tank is shown in the upper photograph of Figure 3-1. Finally, in January 1995 soil samples were collected from two different intervals in boreholes near the drywell. The shallow sampling interval started at the bottom of the drywell at

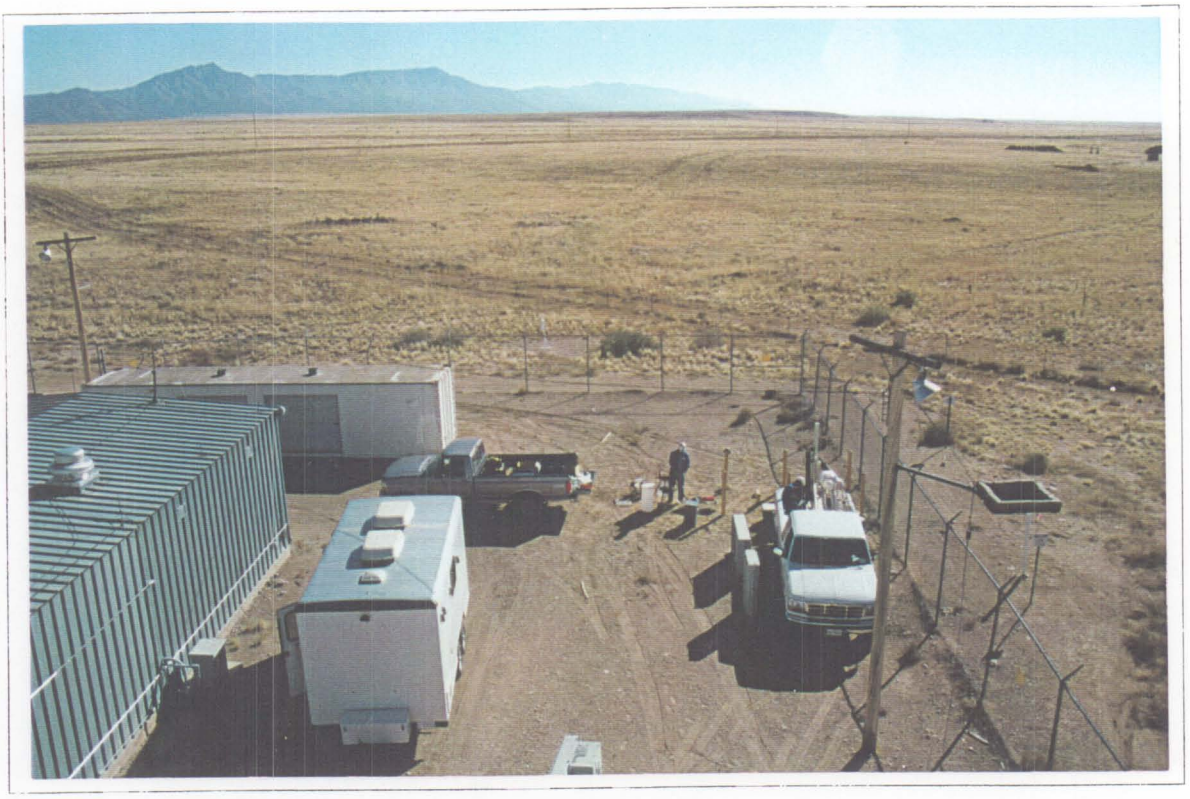
Table 3-1
ER Site 140: Confirmatory Sampling Summary Table

Sampling Location	Analytical Parameters	of Borehole Locations	Top of Sampling Intervals at Each Boring Location	Total Number of Investigative Samples	Total Number of Duplicate Samples	Date(s) Samples Collected
Seepage pit	VOCs	2	11'	2	1	9/26/94
	SVOCs	2	11'	2	1	
	RCRA metals + Cr^{6+}	2	11'	2	1	
	Cyanide	2	11'	2	1	
	Nitrates	2	11'	2	1	
	Isotopic uranium	2	11'	2		
	Gamma spectroscopy	2	11'	2		
Septic Tank	VOCs	2	7'	2		11/15/94
	SVOCs	2	7'	2		
	RCRA metals + Cr^{6+}	2	7'	2		
	Cyanide	2	7'	2		
	Nitrates	2	7'	2		
Drywell	VOCs	2	8', 18'	4		1/11/95
	SVOCs	2	8', 18'	4		
	RCRA metals + Cr^{6+}	2	8', 18'	4		
	Cyanide	2	8', 18'	4		
	Tritium composite	2	8', 18'	2		
	Gamma spec. composite	2	8', 18'	2		

Notes
Cr^{6+} = Hexavalent chromium
RCRA = Resource Conservation and Recovery Act
Spec. = Spectroscopy
SVOCs = Semivolatile organic compounds
VOCs = Volatile organic compounds
* Note: Although the seepage pit and septic tank samples were analyzed for nitrates, the specified hold time of 48 hours was exceeded because of the SNL/NM sample release procedures required because ER Site 140 was designated a Radioactive Materials Management Area (RMMA). The drywell soil samples were not analyzed for nitrates because of this problem.

8 fbgs , and the deeper interval started at 10 feet below the top of the upper interval, or 18 fbgs (SNL/NM January 1995a). Subsurface refusal problems were not encountered in either of the two drywell boreholes.

The Geoprobe™ sampling system was used to collect subsurface soil samples at this site. The Geoprobe™ sampling tool was fitted with a butyl acetate (BA) sampling sleeve and was then hydraulically driven to the top of the designated sampling depth. The sampling tool was opened,



Collecting soil samples around the Building 9965 septic tank with the Geoprobe™, November 15, 1994. View looking south.

Building 9965 septic tank septage removal and cleaning operation, December 12, 1995. View looking southwest.

Figure 3-1. ER Site 140 Photographs

and driven an additional two feet in order to fill the two-foot long by approximately 1.25-inch diameter BA sleeve. The sampling tool and soil-filled sleeve were then retrieved from the borehole. In order to minimize the potential for loss of volatile compounds (if present), the soil to be analyzed for VOCs was not emptied from the BA sleeve into another sample container. The filled BA sleeve was removed from the sampling tool, and the top seven inches were cut off. Both ends of the seven-inch section of filled sleeve were immediately capped with a teflon membrane and rubber end cap, sealed with tape, and placed in an ice-filled cooler at the site. The soil in this section of sleeve was submitted for a VOC analysis.

Soil from the remainder of the sleeve was then emptied into a decontaminated mixing bowl. Following this, additional sampling runs were completed at each interval in order to recover enough soil to satisfy sample volume requirements for the interval. Soil recovered from these additional runs also was emptied into the mixing bowl, and blended with remaining soil from the first sampling run. The soil was then transferred from the bowl into sample containers using a decontaminated plastic spatula.

Seepage pit and septic tank samples were analyzed for VOCs, SVOCs, cyanide, nitrates, RCRA metals, and hexavalent chromium by an offsite commercial laboratory. Drywell samples were analyzed by an offsite commercial laboratory for VOCs, SVOCs, cyanide, RCRA metals, and hexavalent chromium. Samples were shipped to the offsite commercial laboratories by an overnight delivery service. To determine if radionuclides were released from past activities at this site, samples were collected from seepage pit borings and were analyzed by an offsite commercial laboratory for isotopic uranium, and screened for other radionuclides using SNL/NM in-house gamma spectroscopy (SNL/NM July 1995). Composite tritium soil samples were also collected from the drywell shallow and deep intervals for analysis by an offsite commercial laboratory. Composite soil samples from the drywell shallow and deep intervals were also screened for other radionuclides using SNL/NM in-house gamma spectroscopy. Routine SNL/NM chain-of-custody and sample documentation procedures were employed for all samples collected at this site.

Quality assurance/quality control (QA/QC) samples collected during this effort consisted of a set of duplicate soil samples from ST-1 (Figure 1-2) and an aqueous equipment rinsate (equipment blank) sample. These samples were analyzed for most of the same non-radiologic constituents as the other soil samples. No significant concentrations of COCs were detected in the equipment blank sample, and the concentrations of constituents detected in the duplicate soil sample were in good agreement with those detected in the other seepage pit samples from the same interval. Also, soil trip blank samples were included with each the shipments of ER Site 140 seepage pit and septic tank soil samples to the offsite laboratory and were analyzed for VOCs only. Three or more of the following compounds were detected in each of the trip blanks: acetone, ethyl-benzene, 2-hexanone, methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK), methylene chloride, toluene, and xylenes. These common laboratory contaminants were either not detected, or were found in lower concentrations in the site samples than the trip blanks. Soil used for the trip blanks was prepared by heating the material, and then transferring it immediately to the

sample container. This heating process drives off any residual organic compounds (if present), and soil moisture, that may be contained in the material. It is thought that when the soil trip blank container was opened at the laboratory, it immediately adsorbed both moisture and VOCs present in the laboratory atmosphere, and therefore became slightly contaminated.

Summaries of all constituents detected in these confirmatory samples by either commercial laboratory analyses or by the SNL/NM field laboratory are presented in Tables 3-2, 3-3, and 3-4. Results of the SNL/NM in-house gamma spectroscopy soil sample screening for other radionuclides are presented in Appendices A.4 through A.7. Complete soil sample analytical data packages are archived in the SNL/NM Environmental Operations Records Center and are readily available for review and verification (SNL/NM September 1994b, November 1994d, and January 1995b).

3.7 Rationale for Pursuing a Confirmatory Sampling NFA Decision

As discussed in Section 3.4, the passive soil gas survey did not identify any significant concentrations of VOCs at any of the twelve PETREX^{TM} soil-gas sampling locations near the seepage pit, septic tank and drywell at this site.

Confirmatory soil sampling near the seepage pit, septic tank, and drywell did not identify any residual COCs indicating past discharges that could pose a threat to human health or the environment. As shown in Table 3-2, only four VOC compounds (acetone, MEK, methylene chloride, and MIBK), which are common laboratory contaminants, were detected in soil samples collected from this site. All of these VOCs were also detected in one of the trip blanks and all but MIBK was identified in the other trip blank sent to the laboratory. The concentrations of VOCs found in the samples are well below the proposed Subpart S action levels for soil. No SVOCs were detected in the soil samples collected at this site. Cyanide was detected in one of the septic tank soil samples at a concentration of 1,200 micrograms per kilogram (ug/kg) and in both of the soil samples collected near the seepage pit at concentrations of 1,200 and 1,800 ug/kg. These concentrations are much lower than the proposed Subpart S action level of 2,000,000 ug/kg for this constituent. Cyanide was not identified in any of the other septic tank or drywell soil samples.

Although nitrate concentrations are reported in Table 3-2 for the seepage pit and septic tank, the hold time specified for the nitrate analysis was exceeded; the sampling release procedures required because ER Site 140 was designated a Radioactive Material Management Area (RMMA), and the offsite shipping caused the short specified hold time of 48 hours to be exceeded. The drywell soil samples were not analyzed for nitrates because of this problem. The nitrate analysis that was completed detected nitrates in all of the seepage pit and septic soil samples at concentrations ranging from 3,300 to 3,900 ug/kg. These concentrations are much lower than the proposed Subpart S nitrate action level in soil of 100,000,000 ug/kg.

ER Site 140
Summary of Organic and Other Constituents in Confirmatory Soil Samples Collected Around the Septic Tank, Seepage Pit, and Drywell

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Fig. 1-2)	Top of Sample Interval (fbgs)	VOCs Method 8240 Acetone	Ethyl-benzene	2-Hexa-none	MEK	Methylene Chloride	MIBK	Toluene	Xylenes	SVOCs Method 8270	Cyanide Method 9010/9012	Nitrates Method 300 modified	Units
Septic Tank Soil and QA Samples:																	
018479-1,2	Soil	Field	11/15/94	ST-1	7	16	ND	ND	25	2.3 J	1.4 J	ND	ND	ND	1,200	3,900	ug/kg
018480-1,2	Soil	Dupl.	11/15/94	STD-1	7	11 B	ND	ND	26	2.1 J	2.5 J	ND	ND	ND	ND	3,700	ug/kg
018478-1,2	Soil	Field	11/15/94	ST-2	7	12 B	ND	ND	9.7 J	2 J	2.2 J	ND	ND	ND	ND	3,600	ug/kg
018481-1	Soil	TB	11/15/94	Site 140	NA	150	1.9 J	9.7 J	41	12	4.7 J	5	11	NS	NS	NS	ug/kg
Seepage Pit Soil and QA Samples:																	
017932-1,2	Soil	Field	9/26/94	SP-1	11	ND	ND	ND	ND	3.8 B,J	ND	ND	ND	ND	1,800	3,800	ug/kg
017934-1,2	Soil	Field	9/26/94	SP-2	11	ND	ND	ND	ND	2.6 B,J	ND	ND	ND	ND	1,200	3,300	ug/kg
017935-1,2	Soil	TB	9/26/94	Site 140	NA	67	ND	ND	3.9 J	4.4 B,J	ND	ND	ND	NS	NS	NS	ug/kg
Drywell Soil and QA Samples:																	
018902-1,2	Soil	Field	1/11/95	DW-1	8	8.7 J	ND	ND	ND	1.7 J	ND	ND	ND	ND	ND	NS	ug/kg
018903-1,2	Soil	Field	1/11/95	DW-1	18	6.5 J	ND	ND	ND	1.6 J	ND	ND	ND	ND	ND	NS	ug/kg
018904-1,2	Soil	Field	1/11/95	DW-2	8	10	ND	ND	ND	1.7 J	ND	ND	ND	ND	ND	NS	ug/kg
018905-1,2	Soil	Field	1/11/95	DW-2	18	8.5 J	ND	ND	ND	1.4 J	ND	ND	ND	ND	ND	NS	ug/kg
018906-1,2,4	Water	EB	1/11/95	Site 140	NA	ND	ND	ND	ND	3.6 B,J	ND	ND	ND	ND	ND	NS	ug/L
021453-1	Soil	TB	1/12/95	Site 140	NA	47	ND	1.6 J	19	4.3 J	ND	2.3 J	1.4 J	NS	NS	ug/kg	
Laboratory Detection Limit for Soil						10	5	10	10	5	10	5	5	330 or 1,600	500	500	ug/kg
Laboratory Detection Limit for Water						10	5	10	10	5	10	5	5	10	10	NA	ug/L
Proposed Subpart S Action Level For Soil						8E+06	8E+06	None	8E+06	9E+04	4E+06	2E+07	2E+08	NA	2E+06	1E+08	ug/kg

Notes:

B = Compound detected in associated blank sample
Dupl. = Duplicate soil sample
EB = Equipment blank
fbgs = feet below ground surface

J = Result is detected below the reporting limit or is an estimated concentration.
MEK = Methyl ethyl ketone
MIBK = Methyl isobutyl ketone, or 4-methyl-2-pentanone
NA = Not applicable
ND = Not detected

NS = No sample
QA = Quality Assurance
SVOCs = Semivolatile organic compounds
TB = Trip blank
VOCs = Volatile organic compounds

Table 3-3

ER Site 140
Summary of RCRA Metals and Hexavalent Chromium in Confirmatory Soil Samples Collected Around the Septic Tank, Seepage Pit, and Drywell

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Fig. 1-2)	Top of Sample Interval (fbgs)	RCRA Metals, Methods 6010 and 7471								Other Metals: Cr^{6+} Method 7196	Units
						As	Ba	Cd	Cr, total	Pb	Hg	Se	Ag		
Septic Tank Soil Samples:															
018479-2	Soil	Field	11/15/94	ST-1	7	4.9	162	ND	2.3	ND	ND	ND	ND	ND	mg/kg
018480-2	Soil	Dupl.	11/15/94	STD-1	7	4.1	184	ND	1.6 J	ND	ND	ND	ND	ND	mg/kg
018478-2	Soil	Field	11/15/94	ST-2	7	5.6	254	ND	2.9	ND	ND	ND	ND	ND	mg/kg
Seepage Pit Soil Samples:															
017932-2	Soil	Field	9/26/94	SP-1	11	3.7	155	ND	5.3	4.1 J	ND	4.6	ND	ND	mg/kg
017934-2	Soil	Field	9/26/94	SP-2	11	3.9	69.7	ND	4.9	7.1 J	ND	4.5	ND	ND	mg/kg
Drywell Soil Samples:															
018902-2	Soil	Field	1/11/95	DW-1	8	3.6	77.1	ND	3.3	3.5 J	ND	ND	ND	ND	mg/kg
018903-2	Soil	Field	1/11/95	DW-1	18	4.2	67.2	ND	3.6	5.6	ND	ND	ND	ND	mg/kg
018904-2	Soil	Field	1/11/95	DW-2	8	5.1	87.6	ND	4.5	3.7 J	ND	ND	ND	ND	mg/kg
018905-2	Soil	Field	1/11/95	DW-2	18	5.7	48.8	ND	2.3	ND	ND	ND	ND	ND	mg/kg
018906-3	Water	EB	1/11/95	Site 140	NA	ND	ND	ND	ND	0.004	ND	ND	ND	NS	mg/L
Laboratory Detection Limit For Soil						1	1	0.5	1-2 ****	5-10 ****	0.1	0.5	1	0.05 - 0.1 ****	mg/kg
Laboratory Detection Limit for Water						0.01	0.01	0.005	0.01	0.003	0.0002	0.005	0.01	NA	mg/L
Number of SNL/NM Background Soil Sample Analyses *						15	727	1,740	647	536	1,724	2,134	2,302	393	NA
SNL/NM Soil Background Range *						2.1-7.9	0.5-495	0.0027-6.2	0.5-31.4	0.75-103	0.0001-0.68	0.037-17.2	0.0016-8.7	0.02-<2.5	mg/kg
SNL/NM Soil Background UTL or 95th Percentile *						7	214	0.9	15.9	11.8	<0.1	<1.0	<1.0	<2.5	mg/kg
Proposed Subpart S Action Level For Soil						0.50	6,000	80	80,000 **	400 ***	20	400	400	400 **	mg/kg

Table 3-3, concluded:

ER Site 140
Summary of RCRA Metals and Hexavalent Chromium in Confirmatory Soil Samples
Collected Around the Septic Tank, Seepage Pit, and Drywell

Notes:

As = Arsenic. Arsenic background concentrations presented above are based on analyses of subsurface soil samples collected in the Coyote Test Field (CTF) area.

Ba = Barium. Barium background concentrations presented above are based on analyses of subsurface soil samples collected in the Southwest and CTF areas.

Cd = Cadmium. Cadmium background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF, and Offsite areas.

Cr = Chromium. Chromium background concentrations presented above are based on analyses of subsurface soil samples collected in the Southwest area.

Cr^{6+} = Hexavalent chromium. Hexavalent chromium background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

Pb = Lead. Lead background concentrations presented above are based on analyses of subsurface samples collected in the Southwest and Offsite areas.

Hg = Mercury. Mercury background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF and Offsite areas.

Se = Selenium. Selenium background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the North, Tijeras, Southwest, CTF and Offsite areas.

Ag = Silver. Silver background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF, and Offsite areas.

Dupl. = Duplicate soil sample

EB = Equipment blank

fbgs = Feet below ground surface

J = Result is detected below the reporting limit or is an estimated concentration.

NA = Not applicable

ND = Not detected

NS = No sample

UTL = Upper Tolerance Limit

* IT March 1996

** 80,000 mg/kg is for Cr^{3+} only. For Cr^{6+}, proposed Subpart S action level is 400 mg/kg.

*** No proposed Subpart S action level for lead in soil, 400 ppm is EPA proposed action level (EPA July 1994)

**** Detection limit varies due to dilution factor applied to some sample analyses by laboratory.

Table 3-4

ER Site 140
Summary of Isotopic Uranium and Tritium in Confirmatory Soil Samples
Collected Around the Seepage Pit and Drywell

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Fig. 1-2)	Top of Sample Interval (fbgs)	Isotopic Uranium Method EPI A-011B (pCi/g) U-233/ U-234 Result	U-233/ U-234 Error *	U-233/ U-234 D.L.	U-235 Result	U-235 Error *	U-235 D.L.	U-238 Result	U-238 Error *	U-238 D.L.	Tritium Method EPA-600 906.0 (pCi/L) Result	Error *	D.L.
Seepage Pit Soil Samples:																	
023858-1	Soil	Field	9/26/94	SP-1	11	0.773	0.117	0.09	0.037 J	0.021	0.09	0.679	0.107	0.09			
023859-1	Soil	Field	9/26/94	SP-2	11	0.578	0.099	0.09	ND	0.020	0.09	0.543	0.096	0.09			
Drywell Composite Tritium Soil Samples:																	
018902-4	Soil	Compos.	1/11/95	DW-1/2	8										ND	150	250
018903-4	Soil	Compos.	1/11/95	DW-1/2	18										ND	150	240
Number of SNL/NM Background Soil Sample Analyses **						14			283			90			U		
SNL/NM Soil Background Range **						0.44-<5.02			0.004-3			0.153-2.3			U		
SNL/NM Soil Background 95th Percentile **						<5.02			0.16			1.4			U		
Nationwide Tritium Range in Precipation and Drinking Water ***						NA			NA			NA			100-400		

Notes:

U-233 = Uranium 233

U-234 = Uranium 234. Uranium 233/234 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

U-235 = Uranium 235. Uranium 235 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

U-238 = Uranium 238. Uranium 238 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

Compos. = Composite sample
D.L. = Detection limit
fbgs = Feet below ground surface
ND = Not detected
pCi/g = Picocuries per gram
pCi/L = Picocuries per liter

U = Undefined for SNL/NM soils
UTL = Upper Tolerance Limit
* Error = +- 2 sigma uncertainty
** IT March 1996
*** EPA October 1993

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As shown on Table 3-3, in all but three cases, soil sample analytical results indicate that the nine metals that were targeted in the Site 140 investigation were either (1) not detected, or (2) were detected in concentrations below the background UTL or 95th percentile concentrations presented in the SNL/NM study of naturally-occurring constituents (IT March 1996). The concentration of barium in the soil from borehole ST-2 near the septic tank was 254 milligrams per kilogram (mg/kg), which is greater than the SNL/NM soil background UTL of 214 mg/kg for barium. However, this concentration is well below the proposed Subpart S action level of 6,000 mg/kg for barium. Also, selenium was detected in both of the seepage pit boreholes at concentrations of 4.5 and 4.6 mg/kg which is above the 95th percentile selenium concentration of <1.0 mg/kg for SNL/NM soils. However, these concentrations are substantially lower than the 400 mg/kg Subpart S action level for selenium.

Isotopic uranium activity levels that were detected in the seepage pit soil samples were found to be below the corresponding 95th percentile background activity levels presented in the IT March 1996 report for those radionuclides (Table 3-4). Tritium activity was not detected in the drywell shallow and deep interval composite samples.

Also, the gamma spectroscopy semi-qualitative screening of soil samples from this site did not indicate that the soil at ER Site 140 had been contaminated by other radionuclides (Appendices A.4 through A.7).

Finally, the ER Site 140 septic tank contents were removed and the tank was cleaned in December 1995 (SNL/NM December 1995a). The bottom photograph in Figure 3 shows this operation. After it was cleaned, the tank was then inspected by a representative of the New Mexico Environment Department (NMED) to verify that the tank contents had been removed and the tank had been closed in accordance with applicable State of New Mexico regulations (SNL/NM December 1995b).

Ecological risk has not been addressed in this NFA. It is being addressed for ER Site 140 but is not yet complete. When the risk analysis is complete, the results will be forwarded to NMED and EPA.

4.0 CONCLUSION

Sample analytical results generated from this confirmatory sampling investigation have shown that detectable or significant concentrations of COCs are not present in soils at ER Site 140, and that additional investigations are unwarranted and unnecessary. Based on archival information and chemical and radiological analytical results of soil samples collected next to the seepage pit, septic tank, and drywell, SNL/NM has demonstrated that any contaminants present at this site pose an acceptable level of risk under current and projected future land use (Criterion 5 of Section 1.2). Therefore, ER Site 140 is recommended for an NFA determination.

5.0 REFERENCES

5.1 ER Site 140 References

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5.2 Other References

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Appendix A

OU 1295, Site 140
Results of Previous Sampling and Surveys

Appendix A.1

ER Site 140
Summary of Constituents Detected in 1992 Septic Tank Samples

Appendix A.1

ER Site 140
Summary of Constituents Detected in 1992 Septic Tank Samples

Building 9965
Coyote Test Field
Sample ID No. SNLA008427
Tank ID No. AD89046R

On July 16, 1992, aqueous and sludge samples were collected from the inactive septic tank serving Building 9965. Analytical results of concern are noted below.

- Trichloroethene (TCE) was detected in the aqueous sample at a level of 8.1 mg/L, which exceeds the New Mexico Water Quality Control Commission discharge limit (NMDL) of 0.1 mg/L, the City of Albuquerque (COA) discharge limit of 5.0 mg/L and the Resource Conservation and Recovery Act (RCRA) toxicity characteristic (TC) limit of 0.5 mg/L.

- Barium was detected in the aqueous sample at a level of 1.1 mg/L, which exceeds the NMDL of 1.0 mg/L.

- Cadmium was detected in the aqueous sample at a level of 0.014 mg/L, which exceeds the NMDL of 0.01 mg/L.

- Chromium was detected in the aqueous sample at a level of 0.28 mg/L, which exceeds the NMDL of 0.05 mg/L.

- Copper was detected in the aqueous sample at a level of 1.6 mg/L, which exceeds the NMDL of 1.0 mg/L.

- Lead was detected in the aqueous sample at a level of 0.51 mg/L, which exceeds the NMDL of 0.05 mg/L.

- Manganese was detected in the aqueous sample at a level of 0.39 mg/L, which exceeds the NMDL of 0.20 mg/L.

- Mercury was detected in the aqueous sample at a level of 0.0078 mg/L, which exceeds the NMDL of 0.002 mg/L.

- Total phenolic compounds were detected in the aqueous sample at a level of 0.024 mg/L, which exceeds the NMDL of 0.005 mg/L.

- Nitrate/nitrite was detected in the aqueous sample at a level of 11.2 mg/L, which exceeds the NMDL of 10.0 mg/L.

No other parameters were detected in the aqueous fractions above NMDLs, COA discharge limits, or RCRA TC limits that identify hazardous waste.

Appendix A.1, continued:

ER Site 140
Summary of Constituents Detected in 1992 Septic Tank Samples

Laboratory control samples for phenolics were out of laboratory control limits (no analyte was detected), but the analyses were not repeated. The analytical data for phenolics is, therefore, qualified.

During review of the radiological data, no parameters were detected that exceed U.S. Department of Energy (DOE) derived concentration guideline (DCG) limits or the investigation levels (IL) established during this investigation.

ER Site 140
Summary of Constituents Detected in 1992 Septic Tank Samples

Results of Septic Tank Analyses
(LIQUID SAMPLES)

Building No./Area:	9965 CTF
Tank ID No.:	AD89046R
Date Sampled:	7/16/92
Sample ID No.:	SNLA-008427

Analytical Parameter	Measured Concentration	State Discharge Limit	COA Discharge Limit	Comments
Volatile Organics (EPA 624)	(mg/l)	(mg/l)	(mg/l)	
Trichloroethene	8.1	0.1	(TTO=5.0)	Exceeds State and COA Limits; Exceeds RCRA TC limit of 0.5 mg/L
Semivolatile Organics (EPA 625)	(mg/l)	(mg/l)	(mg/l)	
None detected above laboratory		Parameter	(TTO=5.0)	
reporting limits		Specific		
Pesticides (EPA 608)	(mg/l)	(mg/l)	(mg/l)	
beta-BHC	0.00015	NR	(TTO=5.0)	
4,4'-DDD	0.00026	NR	(TTO=5.0)	
4,4'-DDE	0.00029	NR	(TTO=5.0)	
PCBs (EPA 608)	(mg/l)	(mg/l)	(mg/l)	
None detected above laboratory		0.001	(TTO=5.0)	
reporting limits				
Metals	(mg/l)	(mg/l)	(mg/l)	
Arsenic	0.012	0.1	2.0	
Barium	1.1	1.0	20.0	Exceeds State limit
Cadmium	0.065	0.01	2.8	Exceeds State limit
Chromium	0.28	0.05	20.0	Exceeds State limit
Copper	1.6	1.0	16.5	Exceeds State limit
Lead	0.51	0.05	3.2	Exceeds State limit
Manganese	0.39	0.20	20.0	Exceeds State limit
Mercury	0.0078	0.002	0.1	Exceeds State limit
Nickel	---	NR	12.0	Not analyzed
Selenium	ND (0.010)	0.05	2.0	
Silver	0.029	0.05	5.0	
Thallium	ND (0.010)	NR	NR	
Zinc	6.6	10.0	28.0	
Uranium	ND (0.007)	5.0	NR	
Miscellaneous Analytes	(mg/l)	(mg/l)	(mg/l)	
Phenolic Compounds	0.024	0.005	4.0	Exceeds State limit
Nitrates/Nitrites	11.2	10.0	NR	Exceeds State limit
Formaldehyde	0.98	NR	260.0	
Fluoride	0.35	1.6	180.0	
Cyanide	0.053	0.2	8.0	
Oil and Grease	3.6	NR	150.0	
Radiological Analyses	(pCi/l)	(pCi/l)	(pCi/l)	
Radium 226	0.5 +/- 0.1	30.0	NR	
Radium 228	0 +/- 30	30.0	NR	
Gross Alpha	200 +/- 100	NR	NR	
Gross Beta	300 +/- 200	NR	NR	
Tritium	-137 +/- 597	NR	NR	

NR = Not Regulated; ND(#.#) = Not Detected (Reporting Limit); TC = Toxicity Characteristic of Hazardous Waste

Note: City and State Discharge Limits are for comparison purposes only. City limits apply to discharge of sanitary effluent and not septic tank waste; state limits apply to effluent discharged onto or below the surface of the ground.

References - City of Albuquerque NM Sewer Use and Wastewater Control Ordinance (1990), Section 8-6-3, and New Mexico Water Quality Control Commission Regulations (1988) Section 3-100

Appendix A.1, concluded:

ER Site 140
Summary of Constituents Detected in 1992 Septic Tank Samples

Results of Septic Tank Analyses (Sludge Sample)			
Building No./Area:	**9965 CTF**		
Tank ID No.:	**AD89046R**		
Date Sampled:	**7/16/92**		
Sample ID No.:	**SNLA008427**		
Analytical Parameter	**Measured Concentration**	**± 2 Sigma Uncertainty**	**Units**
Water Content	92.8	NA	%
Arsenic	ND (0.50)	NA	mg/kg
Barium	54.1	NA	mg/kg
Cadmium	1.5	NA	mg/kg
Chromium	80.2	NA	mg/kg
Copper	24.5	NA	mg/kg
Lead	13.0	NA	mg/kg
Manganese	12.8	NA	mg/kg
Mercury	0.64	NA	mg/kg
Nickel	---	NA	mg/kg
Selenium	ND (0.50)	NA	mg/kg
Silver	ND (1.0)	NA	mg/kg
Thallium	ND (0.50)	NA	mg/kg
Zinc	129	NA	mg/kg
Gross Alpha	11	12	pCi/g
Gross Beta	17	22	pCi/g
Gross Alpha	20	16	pCi/g
Gross Beta	35	34	pCi/g
Gross Alpha	4	11	pCi/g
Gross Beta	27	24	pCi/g
Gross Alpha	20	14	pCi/g
Gross Beta	24	24	pCi/g
Tritium	-137	597	pCi/L
Bismuth-214	<0.0326 (<16.9)	NA	pCi/mL
Cesium-137	<0.0159 (<3.93)	NA	pCi/mL
Potassium-40	0.337 (<173)	0.0662	pCi/mL
Lead-212	0.0255 (<13.0)	0.00670	pCi/mL
Lead-214	0.0483 (<18.3)	0.0119	pCi/mL
Radium-226	0.430 (<159)	0.0852	pCi/mL
Thorium-234	0.632 (<89.6)	0.0789	pCi/mL
Thallium-208	0.0183 (<9.50)	0.00391	pCi/mL

ND = Not Detected
NA = Not Applicable

Note: Values in parenthesis are measurements reported by Enseco/RMAL in pCi/g (wet weight).

Appendix A.2

ER Site 140
Summary of Constituents Detected in 1994 Septic Tank Samples

Appendix A.2

ER Site 140
Summary of Constituents in 1994 Septic Tank Samples

Sample Number	Sample Matrix	Sample Type	Sample Date	Method	Compound Name	Result	Detection Limit or M.D.A.	+- 2 Sigma Uncertainty	Units
April 1994 Samples:									
015441-3	Sludge	Field	4/12/94	8240 (VOCs)	Acetone	0.089	0.010	NA	mg/kg
				8240 (VOCs)	Benzene	0.002 J	0.005	NA	mg/kg
				8240 (VOCs)	2-Butanone	0.014	0.010	NA	mg/kg
				8240 (VOCs)	Carbon Disulfide	0.005	0.005	NA	mg/kg
				8240 (VOCs)	Ethyl Benzene	0.014	0.005	NA	mg/kg
				8240 (VOCs)	Methylene Chloride	0.002 J B	0.005	NA	mg/kg
				8240 (VOCs)	Toluene	0.10	0.005	NA	mg/kg
				8240 (VOCs)	Xylenes (Total)	0.020	0.005	NA	mg/kg
015441-1	Sludge	Field	4/12/94	TCLP/6010	Arsenic	ND	0.10	NA	mg/L
				TCLP/6010	Barium	2.1	0.02	NA	mg/L
				TCLP/6010	Cadmium	ND	0.005	NA	mg/L
				TCLP/6010	Chromium	ND	0.02	NA	mg/L
				TCLP/6010	Lead	ND	0.04	NA	mg/L
				TCLP/7470	Mercury	0.0003	0.0002	NA	mg/L
				TCLP/6010	Selenium	ND	0.10	NA	mg/L
				TCLP/6010	Silver	ND	0.01	NA	mg/L
015441-1	Sludge	Field	4/12/94	9065	Total Phenols	11	2.3	NA	mg/kg
November 1994 Samples:									
018423-1	Sludge	Field	11/3/94	8270 (SVOCs)	SVOCs	ND	NA	NA	ug/kg
018423-3	Sludge	Field	11/3/94	EPA-600 906.0	Tritium	ND	230	140	pCi/L
		Field	11/3/94	HASL 300	Uranium 238	9.7	0.065	1.1	pCi/g
		Field	11/3/94	HASL 300	Uranium 235	0.25	0.055	0.078	pCi/g
		Field	11/3/94	HASL 300	Uranium 233/234	13	0.074	1.5	pCi/g
018424-3	Liquid	Field	11/3/94	EERF H.01	Tritium	ND	303	168	pCi/L
		Dupl.	11/3/94	EERF H.01	Tritium	ND	303	172	pCi/L
018424-5	Liquid	Field	11/3/94	HASL 300	Uranium 238	0.95	0.055	0.24	pCi/L
	Liquid	Field	11/3/94	HASL 300	Uranium 235	0.001 J	0.07	0.022	pCi/L
	Liquid	Field	11/3/94	HASL 300	Uranium 233/234	2	0.11	0.43	pCi/L
018423-2	Sludge	Field	11/3/94	Gamma Spec.	Uranium Series				
					Lead 214	0.048 J	0.06	0.036	pCi/g
					Thorium Series:				
					Thorium 234	0.52	0.51	0.31	pCi/g
					Lead 212	0.032 J	0.044	0.025	pCi/g
					Other Radionuclides:				
					Potassium 40	1.21	0.55	0.47	pCi/g
018424-1	Liquid	Field	11/3/94	Gamma Spec.	75 radionuclides	NV	7.6E-3 to 5.0	NA	pCi/mL

Appendix A.2, concluded

ER Site 140
Summary of Constituents in 1994 Septic Tank Samples

Notes

B = Compound detected in the laboratory blank.
Dupl.=Duplicate
J = Result is detected below the reporting limit or is an estimated concentration.
M.D.A. = Minimum Detectable Activity
mg/kg = Milligrams per kilogram
mg/L = Milligrams per liter
NA = Not applicable
ND = Not detected
NV = No values reported (results were ND, short half-life, or not significant)
pCi/g = Picocuries per gram
pCi/L = Picocuries per liter
pCi/mL = Picocuries per milliliter
Spec. = Spectroscopy
SVOCs = Semivolatile organic compounds
TCLP = Toxicity Characteristic Leaching Procedure
ug/kg = Micrograms per kilogram
VOCs = Volatile organic compounds

Appendix A.3

ER Site 140
Summary of 1994 PETREX™ Passive Soil-Gas Survey Results

Appendix A.3

ER Site 140
Summary of 1994 PETREX™ Passive Soil-Gas Survey Results

Table 8
PETREX Relative Soil Gas Response Values
(in ion counts)
STD SITE 140

Sample	PCE	TCE	BTEX	Aliphatics
132	ND	ND	22470	4575
133	ND	ND	13515	844
134	ND	ND	1575	ND
135	ND	ND	25552	61981
136	ND	ND	865	4805
137	ND	ND	26541	2226
D-1137	ND	ND	86935	3798
* 900	ND	ND	4553	6219
* 901	ND	ND	4732	ND

PCE - Tetrachloroethene
Indicator Mass Peak(s) 164

TCE - Trichloroethene
Indicator Mass Peak(s) 130

BTEX - Benzene, Toluene, Ethylbenzene/Xylene(s)
Indicator Mass Peak(s) 78, 92, 106

Aliphatics - C4-C11 Cycloalkanes/Alkenes
Indicator Mass Peak(s) 56, 70, 84, 98, 112,
126, 140, 154

D - Duplicate Sample
Sample numbers in thousands duplicate of sample numbers in hundreds

* QA/QC Blank Sample - No Compounds Detected
above the PETREX Normal reporting Limits

Appendix A.3, concluded:

ER Site 140
Summary of 1994 PETREX™ Passive Soil-Gas Survey Results

Table 25
PETREX Relative Soil Gas Response Values
(in ion counts)
STD SITE 140N

Sample	PCE	TCE	BTEX	Aliphatics
336	ND	ND	25487	14947
337	ND	ND	2353	ND
338	ND	ND	1862	8686
339	ND	ND	8970	5487
340	ND	ND	855	ND
341	ND	ND	27201	40293
D-1340	ND	ND	901	ND
* 354	ND	ND	ND	ND
* 355	ND	ND	ND	ND

PCE - Tetrachloroethene
Indicator Mass Peak(s) 164

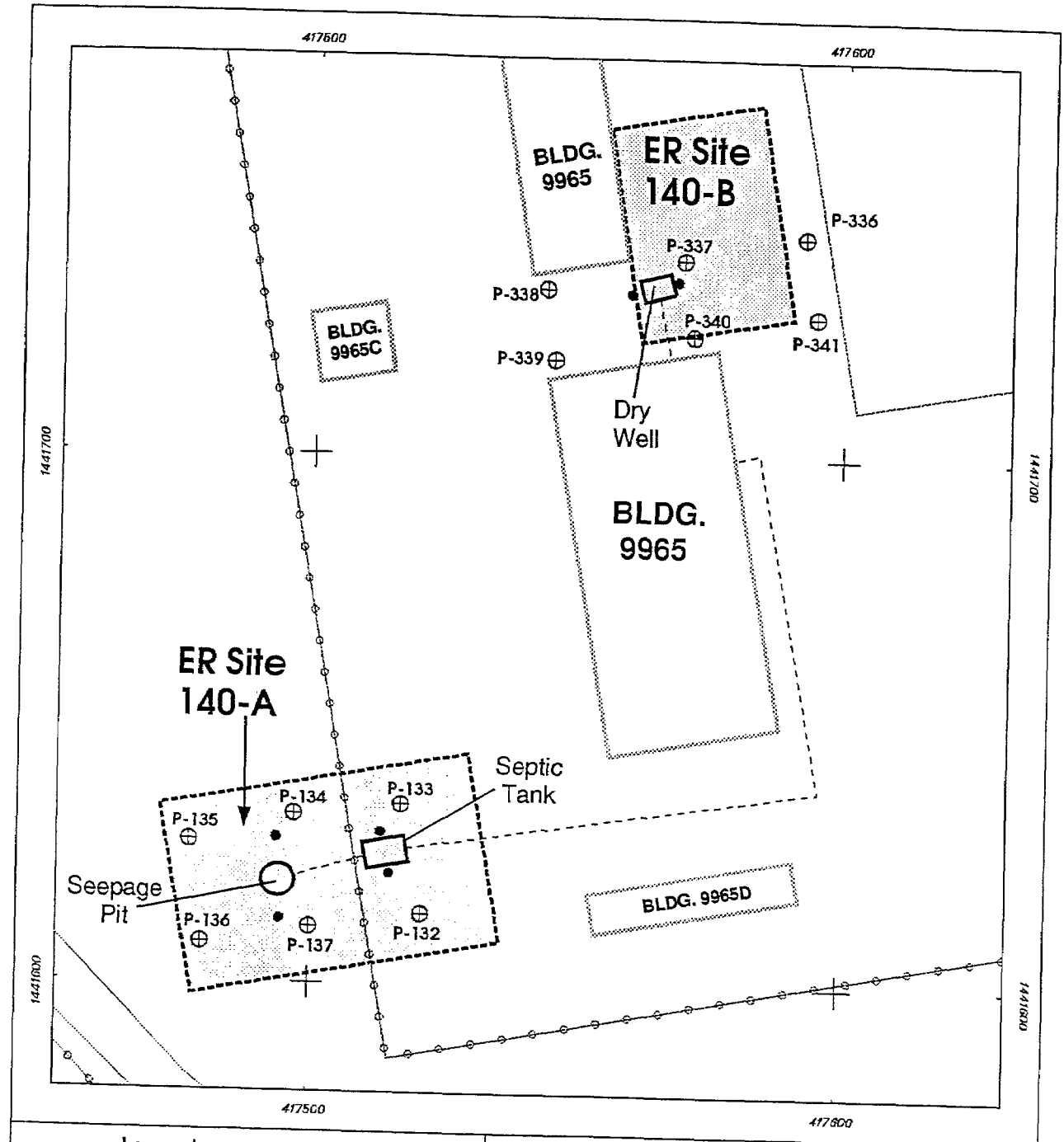
TCE - Trichloroethene
Indicator Mass Peak(s) 130

BTEX - Benzene, toluene, Ethylbenzene/xylene(s)
Indicator Mass Peak(s) 78, 92, 106

Aliphatics - C4-C11 Cycloalkanes/Alkenes
Indicator Mass Peak(s) 56, 70, 84, 98, 112,
126, 140, 154

D - Duplicate Sample
Sample numbers in thousands duplicate of sample numbers in hundreds

* QA/QC Blank Sample - No Compounds Detected
above the PETREX Normal reporting Limits



Legend

- PETREX™ Sampling Location
- Boring Location
- Fences
- KAFB Roads
- Buildings
- Sanitary Sewerline
- Septic Tank, Seepage Pit, Dry Well
- ER Site 140

Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1927 North American Horizontal Datum, 1929 North American Vertical Datum

DRAFT
Unclassified

0 15 30
Scale in Feet

0 3.6 7.2
Scale in Meters

N

APPENDIX A.3
Map Showing
PETREX™ Sampling Locations
for ER Site 140

scmorri SNL GIS ORG. 7512 07/10/96 MAPID=961022

October 13, 2003

ADDITIONAL /SUPPORTING DATA

CAN BE VIEWED AT THE
ENVIRONMENTAL, SAFETY, HEALTH
AND SECURITY (ES&H and Security)
RECORD CENTER

FOR ASSISTANCE CALL
844-4688